

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/591,930 **Confirmation No.:** 4599
Applicant (s) : Michael Vernon Spencer **TC/A.U.** : 1654
Filed : September 07, 2006 **Examiner:** R.T. Niebauer
Title : Production of Low Molecular Weight Ethylcellulose
Docket No. : 63669A
Customer No.: 00109

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Brief is filed further to the Notice of Appeal filed October 8, 2008,
in the above identified application.

I. REAL PARTY IN INTEREST

Dow Global Technologies Inc., a subsidiary of The Dow Chemical
Company.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

No related appeals, interferences, or judicial proceedings.

III. JURISDICTION

The Board has jurisdiction under 35 U.S.C. 134(a). This appeal brief is filed January 8, 2009, concurrently with a one-month extension, further to the Notice of Appeal filed October 8, 2008, appealing the rejections contained in the Final Office Action dated July 8, 2008.

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V. TABLE OF AUTHORITIES

None relied upon.

VI. STATUS OF AMENDMENTS

The response after Final Rejection, which was filed October 8, 2008, was entered. *See Advisory Action dated October 28, 2008.*

VII. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether the Examiner's rejection of Claims 1-5, 7, 8 and 17-19 under 35 U.S.C. § 103(a) as being unpatentable over US 6,261,218 ("Schulz"), US 6,294,008 ("Keary"), US 2,711,965 ("Pyle"), and US 3,728,331 ("Savage") was proper. *See Final Office Action dated July 8, 2008 ("Final Office Action"), page 3.*

B. Whether the nonstatutory obviousness-type double patenting rejection of Claims 1-5, 7, 8 and 17-19 as being unpatentable over claims 1-6 of U.S. Patent No. 6,306,333 ("Rosenberg") *in view of* Schulz, Keary, Pyle, and Savage was proper. *See Final Office Action, page 9.*

C. Whether the nonstatutory obviousness-type double patenting rejection of Claims 1-5, 7, 8 and 17-19 as being unpatentable over claims 1-13 of Schultz *in view of* Schulz [*sic*; the Office action recites 6,261,218 in view of itself], Keary, Pyle, and Savage was proper. *See Final Office Action, page 14.*

D. Whether the nonstatutory obviousness-type double patenting rejection of Claims 1-5, 7, 8 and 17-19 as being unpatentable over claims 10-20 of Keary in view of Schulz, Keary [*sic*; the Office action recites 6,294,008 in view of itself], Pyle, and Savage was proper. *See Final Office Action, pages 19-20.*

VIII. STATEMENT OF FACTS

Applicants have two independent claims, Claim 1 and Claim 8. They each relate to a process for producing an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 1 to 100 mPa's, measured as a 5 weight percent solution in toluene and ethanol at a volume ratio of 80 : 20 at 25° C. *Applicants' Specification* at page 3, lines 3-6.

One claim limitation present in both claims relates to "packaging the depolymerized ethylcellulose without a neutralization step." *Applicants' Specification* at page 6, lines 19-20. This means that residual amounts of hydrogen chloride are still present in the packaged ethylcellulose. The advantages of packaging the depolymerized ethylcellulose without neutralization step after depolymerization are described in *Applicants' Specification* at page 6, lines 19 – 25:

Preferably, depolymerized ethylcellulose is packaged without a neutralization step after depolymerization. By avoiding a neutralization step before the depolymerized ethylcellulose is packaged for transportation and usage, contamination with a basic compound can be avoided. Surprisingly it has been found that the depolymerized ethylcellulose has an *unexpectedly high shelf life*, even if some or all of the used hydrogen chloride is still present in the depolymerized ethylcellulose. Over 4 months under storage at 4 °C, a *viscosity drop of less than 1.5%* of the final viscosity is observed.

Id. As can be appreciated, shelf life is an important feature, and a drop of less than 1.5% is greater than 98.5% retention of viscosity. A perfect retention of

viscosity would correspond to a drop of 0%.

The Examiner made a finding that:

Without a real comparison one can not ascertain if the viscosity drop is merely a function of temperature or some other variable such as concentration. Although applicants ascertain that the 1.5% drop, which is very near the theoretically 'perfect' mark, there is no basis to state that the drop is 'very near'."

Advisory Action dated October 28, 2008 ("Advisory Action"), Continuation Sheet, lines 16-18. Applicants seek clarification as to what evidentiary burden the Applicants must bear in advantages stated in the original specification.

Applicants also seek clarification as to what claim interpretation "neutralization" is given. The Examiner stated in the Advisory Action that "in the instant case, the Savage reference is relied upon for the teaching of packaging without a neutralization step." *Advisory Action, last line.* The Savage relates to peroxide treatment. No acid, such as "in the presence of gaseous hydrogen halide" as claimed in Claims 1 and 8, is utilized in Savage's process. Applicants seek clarification as to whether interpretation to encompass non-acid systems for finding evidence of neutralization is proper.

IX. ARGUMENT

A. Whether the Examiner's rejection of Claims 1-5, 7, 8 and 17-19 under 35 U.S.C. § 103(a) as being unpatentable over Schulz, Keary, Pyle, and Savage was proper.

Applicants submit that the rejection was not proper because the Examiner failed to establish a *prima facie* case of obviousness for at least one of the following reasons.

1. The Examiner Erred by Failing to Meet all Limitations of the Claims

Independent claims 1 and 8 recite "packaging the depolymerized ethylcellulose without a neutralization step." This claim limitation is not met in any of the references cited as prior art. In the Advisory Action, the Examiner has indicated that the instant claims do not exclude residual peroxides and do not exclude additional steps such as heating. *Advisory Action, lines 8-9 from the bottom.* This is irrelevant to whether the claim limitation is met by any of the references cited by the Examiner.

Schulz teaches neutralization following depolymerization (*col.5, l. 17-20*). The Keary and Pyle references do not remedy this deficiency. In fact, Keary et al. teach partial or substantial neutralization as a mandatory step (*claim 10, step g) and column 1, lines 65-66*). Pyle does not even teach a depolymerization process.

The Savage reference is supplied to remedy the deficiency of the Schulz, Keary and Pyle references. In the Final Office Action, the Examiner indicated that "Savage teach the addition of hydrogen peroxide followed by packaging

(column 3, line 66-68) *with no intermediate neutralization step.*" *Final Office Action, page 5, last paragraph* (emphasis added). Likewise, in the Advisory Action, the Savage reference is relied upon for the teaching of packaging without a neutralization step. *Advisory Action, last line.*

As previously pointed out by the Applicants, this is a circular argument. The Savage reference relates to peroxide treatment - since there is no acid utilized in Savage's process, the fact that Savage does not mention neutralization does not mean anything. As a matter of claim interpretation, "neutralization" must be given its ordinary meaning, which, in the chemical arts, is associated with increasing the pH of an acid by adding a base or decreasing the pH of a base by adding an acid.

Other claim limitations are not met. For example, independent Claims 1 and 8 of the present invention recite processes which comprise the steps of "depolymerizing an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 4 to 400 mPa's" (Claim 1) and "a) etherifying alkalized cellulose with ethyl chloride in the presence of an organic solvent to produce an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 4 to 400 mPa.s and b) depolymerizing the produced ethylcellulose" (Claim 8).

The Examiner has admitted: "Schulz does not explicitly teach the ethoxyl content or viscosity of the starting material of claim 1 and 8; the packaging step as in claims 1 and 8; the HCl weight percent as in claim 5; or the presence of an

organic solvent with the ethyl chloride as in claim 8." *Final Office Action*, page 3, last paragraph. Moreover, the Examiner has failed to cite a reference that remedies the deficiencies of the Schulz reference, simply stating: "It would have been obvious to one skilled in the art at the time of invention to determine all optimum conditions (e.g. ethoxyl content, viscosity, HCl weight present)...". *Final Office Action*, page 4, first paragraph. The Examiner has not made the required evidentiary finding regarding "result-effective variables", and thus fails to examine the invention as a whole.

The Examiner has failed to recognize that the ethoxyl content has a significant influence on the properties of the ethyl cellulose obtained in the instantly claimed depolymerization process, as discussed in on page 1, line 31 - page 2, line 28 of the instant patent application. One of the properties influenced by the ethoxyl content is the water solubility of the ethyl cellulose. The Keary and Savage references fail to disclose the ethoxyl content and, thus, remedy the faults of Schultz. The Pyle reference discloses an ethoxyl content, but does not even relate to a depolymerization process. Applicants submit that a proper rejection is based on evidence, and all limitations must be met.

2. In the Rejection under 35 U.S.C. § 103(a) the Examiner Erred by Failing to Establish a Motivation for Combination of References

The Examiner has provided no evidence that depolymerization with hydrogen chloride (the Schulz and Keary references) and depolymerization with hydrogen peroxide (the Savage reference) are sufficiently similar to combine the

references. The Examiner cited *KSR* in the Final Office Action, page 6, paragraph 2, however, *KSR* does not change the fact that some valid motivation must exist to make a proper *prima facie* case of obviousness.

The Schulz and Keary references which disclose depolymerization with hydrogen chloride specifically teach neutralization following depolymerization. On the other hand, the Savage reference relates to peroxide treatment. No acid is utilized in Savage's process, and thus there can be no neutralization step. Since the Savage process has no teaching regarding neutralization, but neutralization is mandatory in the Schulz and Keary references, the skilled artisan would not be motivated to combine the references.

3. In the Rejection under 35 U.S.C. § 103(a) the Examiner Erred by Failing to Give Weight to Statements in the Specification

In their previous responses, Applicants pointed out that claims 1 and 8 reflect the surprising finding of the Applicants that the depolymerized ethylcellulose can be packaged without a neutralization step after depolymerization and the depolymerized ethylcellulose still has an unexpectedly high shelf life. The viscosity of the depolymerized cellulose ether is surprisingly stable, even if some or all of the utilized hydrogen chloride is still present. *Applicants' Specification at page 6, lines 22 - 25.*

The Examiner has indicated "In the instant case, no comparisons are made, for example to the stability of depolymerized ethylcellulose with a neutralization step. As such, the applicant has not met the burden of proof of

showing that the results are unexpected and significant." *Final Office Action*, page 8, lines 4 -7.

Applicants have two issues with this reasoning. First, the Examiner must give weight to Applicants assertions in the specification, and if not giving weight, *must rebut them with evidence*. The essentially non-changed viscosity after storage, being an indication of a stable product in spite of the presence of residual amounts of depolymerization agent, is not a function of temperature or concentration. The 4°C refers to *storage* temperature, not to the temperature at which viscosity is measured. The measurements of the viscosity are done at 25°C under the ASTM methods disclosed on page 4, paragraph 2 of the instant application. As such, Applicants are puzzled by the Examiner's statement that "Further it is unclear what method steps were carried out to achieve the results. As such, it is unclear if the results are commensurate in scope with the claimed invention (see MPEP section 716.02d)". *Advisory Action*, lines 16-18.

Moreover, theoretically, the best case scenario for depolymerized ethylcellulose *with a neutralization step* would show no (0%) viscosity drop. Applicants achieved a viscosity drop of less than 1.5% after 4 months storage time at 4 °C. Considering that a less than 1.5% viscosity drop is essentially within the error of known viscosity measurements, and that the ethylcellulose has not undergone any significant depolymerization while some or all of the utilized hydrogen chloride (depolymerization agent) is still present is contrary to expectation.

B. In the Nonstatutory Obviousness-type Double Patenting Rejection Over Claims 1-6 of Rosenberg in view of Schulz, Keary, Pyle, and Savage the Examiner Erred by Failing to Meet all Limitations of the Claims

Claim 1 of Rosenberg specifically recites "partially or substantially neutralizing the acid." *The Examiner cannot be advancing a valid policy concern to prevent prolongation of the patent's term when the present claims (if granted) would protect a process the very opposite of what Rosenberg protects.*

There are also evidentiary issues, as Rosenberg requires depolymerization with an acid and subsequent partial or substantial neutralization of the acid {steps b) and c) of claim 1} and fail to teach ethyl cellulose, specific ethoxyl contents or hydrogen halide and requires partial or substantial neutralization of the acid (step c) of claim 1). The Schulz, Keary, Pyle, and Savage references do not remedy these deficiencies, as argued above.

The Examiner has provided no evidence that depolymerization with an acid (the Rosenberg, Schulz and Keary references) and depolymerization with hydrogen peroxide (the Savage reference) are sufficiently similar to combine the references.

The Rosenberg, Schulz and Keary references, which disclose depolymerization with an acid, specifically teach neutralization following depolymerization. Since neutralization in the Savage process is meaningless, but neutralization is mandatory in the Rosenberg, Schulz, and Keary references, the skilled artisan would not be motivated to reject the teachings of the more

applicable references to try the depolymerization process with an acid, but without a neutralization step.

C. Whether the nonstatutory obviousness-type double patenting rejection of Claims 1-5, 7, 8 and 17-19 as being unpatentable over claims 1-13 of Schultz in view of Schulz [sic], Keary, Pyle, and Savage was proper.

Applicants believe that this rejection is improper because it is not set out in a manner that is clear and concise. The Final Office action states "One would be motivated to combine '218 with the work of Shultz ...". *Final Office Action, page 15, line 4. The '218 patent is Shultz*, and thus the rejection is not sufficiently reasoned. On a less technical note, Applicants have demonstrated in the foregoing pages that the combination of Schulz, Keary, Pyle, and Savage do not render the present invention obvious.

D. Whether the nonstatutory obviousness-type double patenting rejection of Claims 1-5, 7, 8 and 17-19 as being unpatentable over claims 10-20 of Keary in view of Schulz, Keary [sic], Pyle, and Savage was proper.

Keary's Claim 10 recites "partially or substantially neutralizing the hydrogen chloride." *The Examiner cannot be advancing a valid policy concern to prevent prolongation of the patent's term when the present claims (if granted) would protect a process the very opposite of what Keary protects.*

X. APPENDIX

A. Claims Section

1. (Rejected: On Appeal) A process for producing an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 1 to 100 mPa's, measured as a 5 weight percent solution in toluene and ethanol at a volume ratio of 80 : 20 at 25° C, which process comprises the step of

depolymerizing an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 4 to 400 mPa's in the presence of gaseous hydrogen halide to achieve a reduction in viscosity of the ethylcellulose of at least 10 percent and

packaging the depolymerized ethylcellulose without a neutralization step after depolymerization.
2. (Rejected: On Appeal) The process of Claim 1 wherein an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 1 to 10 mPa's is produced.
3. (Rejected: On Appeal) The process of Claim 1 wherein the depolymerization is conducted in the presence of gaseous hydrogen chloride.
4. (Rejected: On Appeal) The process of Claim 1 wherein the depolymerization step is conducted in the presence of from 0.5 to 5.0 percent of

water, based on the weight of the ethyl cellulose.

5. (Rejected: On Appeal) The process of Claim 1 wherein the depolymerization step is conducted in the presence of from 0.1 to 0.5 weight percent of hydrogen chloride, based on the total weight of ethylcellulose to be depolymerized.
6. (Canceled)
7. (Rejected: On Appeal) The process of Claim 1 wherein an ethylcellulose having a viscosity of from 4 to 100 mPa's is depolymerized to an ethylcellulose having a viscosity of from 1 to 2.5 mPa's.
8. (Rejected: On Appeal) A process for producing an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 1 to 100 mPa's, measured as a 5 weight percent solution in toluene and ethanol at a volume ratio of 80 : 20 at 25° C, which process comprises the steps of
 - a) etherifying alkalized cellulose with ethyl chloride in the presence of an organic solvent to produce an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 4 to 400 mPa's and
 - b) depolymerizing the produced ethylcellulose in the presence of gaseous hydrogen halide to achieve a reduction in viscosity of the ethylcellulose of at

least 10 percent and

c) packaging the depolymerized ethylcellulose without a neutralization step after depolymerization.

10.-16. (Canceled)

17. (Rejected: On Appeal) The process of Claim 8 wherein an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 1 to 10 mPa's is produced.

18. (Rejected: On Appeal) The process of Claim 8 wherein the depolymerization is conducted in the presence of gaseous hydrogen chloride.

19. (Rejected: On Appeal) The process of Claim 8 wherein the depolymerization step is conducted in the presence of from 0.5 to 5.0 percent of water, based on the weight of the ethyl cellulose.

20. (Canceled)

B. Claim Support Section

1. (Rejected: On Appeal) A process for producing an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 1 to 100 mPa's, measured as a 5 weight percent solution in toluene and ethanol at a volume ratio of 80 : 20 at 25° C, which process comprises the step of depolymerizing an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 4 to 400 mPa's in the presence of gaseous hydrogen halide to achieve a reduction in viscosity of the ethylcellulose of at least 10 percent **{page 3, lines 3-9}** and packaging the depolymerized ethylcellulose without a neutralization step after depolymerization **{page 6, lines 19-20}**.

2. (Rejected: On Appeal) The process of Claim 1 wherein an ethylcellulose having an ethoxyl content of from 40 to 55 percent **{page 4, lines 1-2}** and a viscosity of from 1 to 10 mPa's **{page 4, lines 13-16 }** is produced.

3. (Rejected: On Appeal) The process of Claim 1 wherein the depolymerization is conducted in the presence of gaseous hydrogen chloride. **{page 5, lines 22-24}**

4. (Rejected: On Appeal) The process of Claim 1 wherein the depolymerization step is conducted in the presence of from 0.5 to 5.0 percent of

water, based on the weight of the ethyl cellulose. **{page 5, lines 30-32}**

5. (Rejected: On Appeal) The process of Claim 1 wherein the depolymerization step is conducted in the presence of from 0.1 to 0.5 weight percent of hydrogen chloride, based on the total weight of ethylcellulose to be depolymerized. **{page 5, lines 27-29}**

6. (Canceled)

7. (Rejected: On Appeal) The process of Claim 1 wherein an ethylcellulose having a viscosity of from 4 to 100 mPa's is depolymerized to an ethylcellulose having a viscosity of from 1 to 2.5 mPa's. **{page 4, lines 18-20 and 21-23}**

8. (Rejected: On Appeal) A process for producing an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 1 to 100 mPa's, measured as a 5 weight percent solution in toluene and ethanol at a volume ratio of 80 : 20 at 25° C **{page 3, lines 3-6}**, which process comprises the steps of

a) etherifying alkalized cellulose with ethyl chloride in the presence of an organic solvent to produce an ethylcellulose having an ethoxyl content of from 40 to 55 percent and a viscosity of from 4 to 400 mPa's **{page 4, lines 28-31}** and

b) depolymerizing the produced ethylcellulose in the presence of gaseous hydrogen halide to achieve a reduction in viscosity of the ethylcellulose of at least 10 percent **{page 3, lines 6-9}** and

c) packaging the depolymerized ethylcellulose without a neutralization step after depolymerization **{page 6, lines 19-20}**.

10.-16. (Canceled)

17. (Rejected: On Appeal) The process of Claim 8 wherein an ethylcellulose having an ethoxyl content of from 40 to 55 percent **{page 4, lines 1-2}** and a viscosity of from 1 to 10 mPa's is produced **{page 4, lines 13-16}**.

18. (Rejected: On Appeal) The process of Claim 8 wherein the depolymerization is conducted in the presence of gaseous hydrogen chloride. **{page 5, lines 22-24}**

19. (Rejected: On Appeal) The process of Claim 8 wherein the depolymerization step is conducted in the presence of from 0.5 to 5.0 percent of water, based on the weight of the ethyl cellulose. **{page 5, lines 27-29}**

20. (Canceled)

XI. SIGNATURE BLOCK

The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 041512.

Respectfully submitted,

January 8, 2008

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